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AUTHOR Dahl, Rene F.
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ABSTRACT

This paper examines the extent to which legitimacy affects program continuation, and focuses on the process by which programs attempt to maintain legitimate status through conformity with the larger environment. Legitimacy is defined as cultural support from a program's larger environment, such as the school district or community. An innovative mathematics-science curriculum, Finding Out/Descubrimiento, is studied to test a three-part hypothesis: the formal continuation, quality, and duration of an instructional innovation will be positively associated with its degree of perceived acceptance by administrators. Observation and questionnaires are the methods used in this sample of 26 predominantly urban schools and 51 teachers. Three measures of the independent variable, legitimacy, are combined to create an index, which is correlated with the three dependent variables: formal continuation, quality, and extent. Regression analysis controls for three other variables: grade level, resources, and first-year implementation. The findings demonstrate support for the hypothesis. A positive statistically significant relationship exists between legitimacy and: (1) formal continuation; (2) four indicators for quality of continuation; and (3) two indicators for the extent of continuation. The appendix includes statistical tables to support the conclusions. (6 references) (LMI)

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LEGITIMACY AND PROGRAM CONTINUATION

Rene Fukuhara Dahl
San Francisco State University

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LEGITIMACY AND PROGRAM CONTINUATION

INTRODUCTION

Since the 1970's, a proliferation of research has been conducted to determine what factors explain the continuation of innovative instructional programs in schools. Most of this research on program continuation has focused on organizational factors or teacher characteristics that influence continuation. This line of research has yielded important and informative findings. There is a need, however, for research that examines what factors in the school's or district's environments influence long-term program survival.

In this study, I examine the extent to which legitimacy affects program continuation. As described below in the theoretical framework, legitimacy refers to cultural support from the school's and district's environment. Environment refers to the institutional environment which includes belief systems as well as relational networks that arise in the broader societal context (Meyer and Scott, 1983, p. 14).

THEORETICAL FRAMEWORK and HYPOTHESES

This study uses the institutional model of organizations (Meyer and Rowan, 1977) as its theoretical framework. According to this model, schools exist in highly institutionalized environments and are interpenetrated by and are very responsive to the demands of their environments. Schools reflect environmentally created institutionalized rules defining what a school is and conform to those rules because it is adaptive for them to do so. In other words, schools are supported and funded to the extent that they conform to those institutionalized rules (Meyer et al., 1981). Of central importance to schools is their **legitimacy** - the degree of cultural support for the organization (Meyer and Scott, 1983). Meyer and Scott emphasize that legitimacy is derived from a wider environment and typically is operationalized as laws, rules, and regulations.

Of particular interest to this study is **the way schools try to maintain their legitimate status by conforming to shared understandings of proper topics of instruction.** Schools go to great lengths to maintain their legitimate status. They gain cultural support by adopting instructional programs that are agreed on in the larger environment as being proper, acceptable, and worth doing. In this study, I adapt the concept of legitimacy to mean the degree of cultural support for the innovation rather than the organization as a whole. In the

hypotheses tested in this study, I argue that the continuation of an innovation will be positively related to the legitimacy of the innovation, as measured by responses from district level staff.

Three hypotheses are tested in this study.

1) The continued formal existence of an instructional innovation will be positively associated with the degree of perceived acceptance of the program by administrators.

2) The quality of an instructional innovation that continues over time will be positively associated with the degree of perceived acceptance of the program by administrators.

3) The extent to which an innovative program continues over time will be positively associated with the degree of perceived acceptance of the program by administrators.

THE INNOVATION

The innovation examined in this study is a math and science curriculum called Finding Out/Descubrimiento (De Avila and Duncan, 1982). The goal of this innovative curriculum is to foster the development of higher order thinking skills in elementary school children. The Finding Out/Descubrimiento (FO/D) curriculum has seventeen physics and chemistry themes and 130 activities grouped around these themes. Task cards and worksheets are written in Spanish, English, and pictographs and present students with open-ended tasks that are purposely ambiguous and require the use of problem-solving skills.

Students work in small groups (or learning centers) of three to five students, and use manipulative materials designed to help them understand abstract scientific concepts by hypothesizing, estimating, experimenting, analyzing, and working together. This curriculum is designed primarily for students in the second through fifth grades and is effective particularly with heterogeneous populations where the teacher works with students who have a wide range of academic and linguistic skills and cultural backgrounds.

THE SETTING AND SAMPLE

The study was conducted in eight school districts of varying sizes in the greater San Francisco Bay area. Seven districts were urban, one was rural. Twenty-six schools were involved in the study and all but two schools were urban. A large number of students were classified as "language minority" and came from low-income families. Based on data collected from the schools, there was an average of 45 percent Hispanic students, and an average of ten percent of the stuents from Asian and South Pacific Island descent.

The sample of 51 teachers came from a population of 61 teachers who voluntarily participated in a two-week training to learn how to use the Finding Out/Descubrimiento (FO/D) program, from 1982-85. Ten teachers could not be located. The teachers in the sample met two criteria: first, they were trained at Stanford University, and therefore, had received standardized training; and second, they had implemented the program for a minimum of three years. For this study, the teachers were divided into four cohorts. Each cohort was comprised of all the teachers who had been trained in a particular year (see Table 1).

Table 1 here.

DATA COLLECTION

Data were collected during the 1986/87 and 1987/88 school years using three instruments. The first instrument, the Whole Class Instrument, was used to observe students working in the classroom and focused on the groupings of students as they worked in the FO/D program. Five visits were made to each classroom and during each visit, two observations were taken. This resulted in a total of ten observations per classroom. The first observation was taken during the early part of the learning center activities.

The second observation was taken during the middle or later part of the learning center time. Because the Whole Class Instrument is sensitive to the time at which an observation is taken, taking two observations at different times at the learning center period helped to insure that the student activities recorded by observers were a representative sample of the range of possible student activities. To reduce the possibility of bias that student groupings and activities were influenced by the particular curriculum unit being implemented, whenever possible, observational data for each classroom were collected across various units. Inter-observer reliability was measured by the percentage agreement based on a comparison of scoring by rater and supervisor. Reliability on the Whole Class Instrument was 93.5%.

The second instrument used was the District Questionnaire. It was used to collect data regarding the legitimacy of the program as perceived by district level staff. The questionnaire was field-tested by a district representative not involved in the study. Once revisions were made based on feedback, the questionnaire was mailed to the district staff person who was designated as the program representative and/or the person in the district who was most knowledgeable about the program.

The third instrument, the Teacher Questionnaire, was used to gather data about the extent to which the teachers used the innovation and how many curriculum units they had completed. The questionnaire was field-tested using a small sample of teachers that had used the FO/D curriculum but were not a part of the study during the first year. Based on responses from the field-test, revisions were made to the questionnaire and it was mailed to the teachers. There were several versions of the questionnaire because it was necessary to phrase questions differently and/or to ask different questions, depending upon whether or not a teacher had continued to use the program or had stopped using the program.

MEASUREMENT

Three measures of the independent variable, legitimacy, were taken from the District Questionnaire and were combined to create an index. The first indicator was designed to determine if FO/D was used by the district to increase its legitimacy with its environment by appearing to conform to the rules and regulations of constituencies in the wider environment. The second indicator also was used to determine if the district considered the program to be a valid and proper form of instruction, thereby increasing the district's legitimacy. The third measure determined the perceived level of awareness that relevant district personnel had of the innovation.

Measures of the three dependent variables: 1) formal continuation; 2) quality of continuation; and 3) extent of program continuation, were taken from the Whole Class Instrument, the Teacher Questionnaire, and from meetings and/or phone conversations with teachers or their principals. The indicator for formal continuation was whether or not a teacher continued to use the innovation three years after training. This was determined in conversations with teachers and/or their principals. The four measures for quality of continuation were taken from the Whole Class Instrument, and focused on student activity occurring in the classroom. These measures were: the percentage of students talking/working together; an index of

classroom management; differentiation of teaching materials; and a summary measure of implementation. The extent of program continuation was measured by the frequency with which the teacher used the program and how many curriculum units were covered by the teacher. These three measures were taken from the Teacher Questionnaire.

Three control variables were used in this study: 1) grade level; 2) resources; and 3) first year implementation. Research by Lotan (1985) indicated that the number of curriculum units a teacher completed was related strongly to grade level. The hands-on science and math program requires many manipulative materials, thus, the adequacy of resources had the potential to affect the number of curriculum units taught. First year implementation was used to control for variation in first year implementation of the program.

INITIAL RESULTS

Rate of Continuation

In this section, I present data regarding the overall state of continuation of the FO/D program. These data provide the context within which the hypotheses are tested. Table 2 shows

the status of teachers who were trained to use the FO/D program three years after their training. Data are presented for the overall sample as well as by cohort.

Table 2 here

Three years after training, 32 out of 61 teachers, or 52 percent were implementing FO/D. Nineteen teachers, or 31 percent, had stopped using the program. Of the original 61 teachers, data were not available on ten teachers.

Of the seventeen teachers in Cohort I, 59 percent, or ten teachers continued to use FO/D. Four teachers, or 24 percent, did not continue. Data were not available on three teachers. Three of the four teachers who stopped using the program were transferred to administrative programs, while one teacher was transferred to a middle school.

In Cohort II with eleven teachers, one teacher (9%) continued to use FO/D three years after training. Seven teachers (64%) had stopped, and three teachers could not be located. Examples of why teachers stopped using FO/D include: because it was too demanding, one teacher didn't like the program, and another teacher became a part-time administrator.

Of the nineteen teachers in Cohort III, thirteen teachers, or 68 percent, continued to use the program. Three teachers, or 16 percent, had stopped, and data were not available for two teachers. The teachers who stopped using FO/D did so because of changes in their assignments.

In Cohort IV, eight out of fourteen teachers, or 57 percent, continued to use FO/D, while five teachers, or 36 percent, had stopped. Data were not available on two teachers. Most of the teachers in this cohort who stopped using FO/D did so because they were transferred to grade levels or schools not using FO/D.

The two most common reasons teachers cited for continuing to use FO/D was that the program worked for students and the students liked the program. For example, one teacher stated, "...of all my training, FO/D put all the pieces together...it really works and I get excited watching the kids learn."

Quality of Program Continuation

While I measured formal continuation three years after training, the quality of implementation that I observed in classrooms in 1986/87 and 1987/88 reflected a variable number of years of training. For example, of the 21 teachers for whom I had classroom observational data, seventeen were observed in

their third year after training; one teacher was in her fourth year of implementation; and three teachers were observed in their fifth year of implementation.

I collected classroom observational data on 21 of the 32 teachers who were classified as "Continuing." I was not able to collect classroom data on the entire "Continue" sample for several reasons. First, some of these teachers who were classified as continuers in their third year were no longer implementing the program when I contacted them. For instance, I contacted several teachers who had trained five years earlier, who reported using FO/D three years after training, but were not using the program when I talked with them. In those cases, it was not possible to get classroom data. Second, several teachers verified that they were implementing the program in their third year but did not give me access to their classrooms. In another instance, one teacher granted me access to her classroom but stopped using the program mid-way through my observations.

In 1987, the Program for Complex Instruction developed quality control standards by which to judge the quality of program implementation. To develop the criteria, past sets of data were examined in which various measures from the Whole Class Instrument were related to each other and to achievement gains. For example, by examining the relationship between percentage of

students talking and working together to gains on standardized achievement tests, it was possible to determine the point below which achievement gains began to diminish when talking and working together diminished. From this analysis, the following criteria were developed. The criteria made it possible to assess the degree to which implementation problems existed (Cohen and Lotan, 1987).

QUALITY CONTROL STANDARDS

Less than 30 percent of students talking and working together. Analysis of past data showed that when less than 30 percent of students in a classroom were talking and working together, learning gains on standardized tests began to diminish.

More than 6 percent of students disengaged. When two categories of disengaged behavior were combined into one overall category of disengagement, management problems became obvious to outside observers when six percent or more of the students were disengaged.

More than 12 percent of students in transition or waiting for teacher. This percentage in either of these categories by themselves is not potentially problematic. When added together, and also when combined with percentage of students disengaged, high percentages of students in these categories indicate problems with classroom management and teacher delegation of authority that interfere with students talking/working together.

The percentages for the quality control standards are repeated classroom observations for each classroom while students are at learning centers. Table 3 shows a comparison of the classrooms in this study to the quality control standards.

Table 3 here.

For the category "Talk/Work", only one classroom in the sample fell below the quality control standard of less than 30 percent, while 20 teachers were above the standard. In the "Disengaged" category, seven classroom had a greater percentage of disengagement than the quality control standard, indicating that one-third of the classrooms had a high percentage of classroom management problems in comparison to FU/D classes observed in the past. Note, however, that four of these seven

classes were within the six to seven percent range, which equals approximately two out of 30 students. Overall, fourteen classrooms, or two-thirds of the classrooms had percentages below the quality control standards on one of the criteria, percentage "Disengaged", and one classroom fell below the standards on two criteria, "Talk/Work" and "Disengaged".

All classrooms in this sample met the quality control standard for percentage of students "Waiting for an Adult" and percentage of students "In Transition", indicating that these categories were not problematic in these classrooms. In other words, they did not have large percentages of their students waiting for the teacher or in transition.

Extent of Program Continuation

During the first year of implementation, program developers encouraged teachers to use the following pattern: to start using FO/D in October at the latest; to implement the program four days a week; and to continue using the program through June of the following year. The only break that teachers should take would be between a few days to a week, to prepare materials for the next unit. By implementing the program between eight to nine months, four days a week, the teacher could cover almost all of the FO/D units in the curriculum. Additionally, it was important

that students be exposed to the new form of instruction that used small groups and open-ended tasks, as well as socialization to cooperative group norms and roles on a regular basis.

In this sample of 32 teachers who continued to use the program, the average number of months teachers implemented FO/D was between four and five months. Only nine teachers implemented the program between eight and nine months. On average, the teachers used the program one to two days per week. Of the seventeen FO/D units, the average number of units completed was between two and seven units. These data are summarized in Table 4.

Table 4 here.

Testing the Hypotheses

In this study, tests of the hypotheses were conducted at the teacher/classroom level.

The prediction for the first hypothesis was that the legitimacy of the program would be positively related to program continuation. To test this hypothesis, I assigned to each teacher in the sample (N=51) the legitimacy score for the district in which she taught. Then I used the Pearson correlation to determine the strength of the association between

legitimacy and continuation. The Pearson r was .26, p <.05, indicating a positive, statistically significant relationship exists between legitimacy and program continuation.

For the second hypothesis, a positive relationship was predicted between the legitimacy of FD/D and the quality of program continuation. In other words, I predicted that the higher the legitimacy of the program, the higher the quality of program continuation. The sample size for this analysis was 21, reflecting the number of teachers for whom I collected classroom data. For some of the analyses, data were missing, however, resulting in a smaller sample. The results showed a positive, statistically significant relationship between legitimacy and quality of continuation, as measured by differentiation and general implementation, when controlling for first year implementation. Intercorrelations of legitimacy and quality of program continuation are shown in Table 5.

Table 5 here.

The results indicate no relationship between legitimacy and two of the quality of continuation measures - Talk/Work, r=-.00 and Management, r=.09. Two positive relationships were found; legitimacy and differentiation, r=.43, p <.05, and legitimacy and

implementation, r=.22, not significant. In an additional analysis, controls on first year implementation strengthened the relationship between legitimacy and implementation to r=.33, p <.05.

The third hypothesis predicted a positive relationship between legitimacy and the extent to which the program continued. The sample size of 32 included all teachers who continued to use the innovation three years after training. The varying sample size in the analyses, however, reflects missing data. Tests of the hypothesis showed a positive, statistically significant relationship between legitimacy and extent of program continuation, measured by the number of months FU/D was used and by the number of FU/D units completed. The intercorrelations of legitimacy and the extent of program continuation are shown in Table 6.

Table 6 here.

Two positive relationships were found: between legitimacy and number of months FU/D was used, r=.37, p <.05, and legitimacy and number of FU/D units completed, r=.44, p <.01. In the analysis of legitimacy and FU/D units completed, when an outlier was removed from the sample, the Pearson r increased to .56, p <.001. In a further analysis of legitimacy and FU/D units, when

grade level was held constant, the Pearson r increased again, to .62, p <.001. To further examine the relationship of legitimacy and FU/D units, I conducted a regression analysis, controlling for grade level and adequacy of resources. As the results of the analysis indicate in Table 7, the model was statistically significant at p <.001. The relationship between legitimacy and FU/D units was positive but weakened, however, it was still statistically significant at r=.49, p <.001. No relationship was found between legitimacy and the number of days per week that FU/D was used, r=.06.

Table 7 here.

DISCUSSION OF FINDINGS

The results of the analyses show support for the legitimacy hypotheses. First, there is a positive, statistically significant relationship between legitimacy and formal continuation. Next, two of the indicators for quality of program continuation - differentiation and general implementation - have positive, statistically significant relationships with legitimacy.

The differentiation indicator was problematic to some extent, because it assumed that more differentiation was better. For example, the classroom that ranked at the top of this measure used too many groups (e.g. eight) that were too small (only two students), which created a problem of having sufficient resources for each group in the classroom. The positive relationship between legitimacy and differentiation could be an artifact of this problematic assumtion, although the range of differentiation was reduced when the outlier was removed from the sample.

The second positive relationship was between legitimacy and general implementation. These results were surprising in that two of the three variables that comprise this index showed no relationship to legitimacy. These measures were Talk/Work and classroom management. The third measure was differentiation, which had a strong positive relationship with legitimacy. Since differentiation is part of the implementation measure, this relationship probably accounts for the positive relationship between legitimacy and implementation.

Differentiation is a distinctive feature of the technology, and perhaps, in this study, served a symbolic purpose. Technological complexity is a distinctive feature of FD/D. It is easy to see, for example, features of differentiation in the classroom, without knowing the quality of program implementation.

Multiple learning centers and multiple learning materials are clear signs that FO/D is in use in the classroom. A district that is concerned about maintaining its legitimacy with relevant constituents in its environment or concerned about meeting state requirements can point to the use of multiple learning centers and multiple sets of materials in FO/D classrooms as proof that it is complying with state requirements for coopertive learning or hands-on math and science programs. Because compliance can increase, or at least help a school district to maintain legitimacy, and legitimacy is linked to survival, funds could be forthcoming for districts or schools that appear to be complying with regulations or requirements.

The lack of association between legitimacy and Talk/Work can be explained from institutional theory. If, in fact, organizational elites do not focus on the technology, but on maintaining or increasing the organization's status with the environment, there would be no logical connection between Talk/Work (as an indicator of the core technology) and legitimacy. One can imagine organizational elites scanning the environment for proper forms of instruction, finding programs that meet relevant criteria, and adopting these forms of instruction. Once that task is completed, organizational elites

once again return to scanning the environment for new and improved forms of instruction that will help them to maintain their legitimacy.

Results from the analyses also showed support for the hypothesis predicting a positive relationship between legitimacy and extent of program continuation. Two of the indicators for the extent of continuation had positive, statistically significant associations with legitimacy, specifically, the number of months that FO/D was used and the number of FO/D units implemented.

From the perspective of institutional theory, the number of months that FO/D was used and the number of FO/D units completed can be considered symbolic - evidence to the wider environment that the program is being used in the district or school. The actual quality of the technology is not evaluated or subject to inspection and all parties can be content that good faith efforts on the part of the schools and districts are being made to comply with requirements of the environment. Therefore, the activity of FO/D has ritual significance for the districts where it is used and might be an example of how the organization links requirements of ceremonial elements to technical activities of the organization (Meyer and Rowan, 1977).

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Table 1 Cohorts of Finding Out/Descubrimiento Teachers By Year of Training

Cohort	Number of Teachers	Year Trained	Third Year of Implementation
I	17	1982/83	1984/85
II	11	1983/84	1985/86
III	19	1984/85	1986/87
IV	14	1985/86	1987/88

Table 2 Status of Teachers Trained to Use Finding Out Descubrimiento by the Program for Complex Instruction: Three Years After Training 1982 - 1985

Cohort	Year Trained	N	Continue	Not Continued	Not Located
I	1982/3	17	10	4	3
II	1983/4	11	1	7	3
III	1984/5	19	13	3	2
IV	1985/6	14	8	5	2
	TOTALS	61	32	19	10

Table 3 Comparison of Teachers in This Study to Quality Control Standards for Program Implementation

N=21

Class	% Talk/Work	% Disengaged	% Wait and In Transition
01	61.1	3.1	1.9
03	45.9	2.4	1.6
05	65.5	3.3	0.0
06	52.7	1.2	2.0
07	41.7	0.6	0.5
08	44.0	*7.8	2.5
09	48.8	1.7	7.2
10	47.6	0.5	8.6
11	48.8	2.8	8.2
12	59.5	3.1	5.3
13	50.2	1.8	7.4
14	37.2	*11.7	3.8
32	35.1	*9.3	4.4
35	38.3	5.6	3.9
36	45.4	4.5	0.0
37	+28.5	*11.1	7.5
38	50.5	1.6	4.3
39	31.6	*6.1	3.7
41	42.2	2.2	1.1
44	38.3	*6.5	5.3
45	52.1	*6.0	2.0
Quality Control Standards	< 30%	> 6%	> 12% for both categories

* Indicates that percentage exceeds quality control standards.

+ Indicates that percentage fell below quality control standards.

Table 4 Extent of Program Continuation

Months	8-9	6-7	4-5	2-3	1
#Teachers	9	11	3	3	3

Days/Week	Every Day	3-4	1-2
#Teachers	3	18	7

Units	16+	11-15	8-10	4-7	<3
#Teachers	1	4	8	13	3

Table 5 Pearson Correlations of Legitimacy and Quality of Continuation

N=20

	Legitimacy
Talk/Work	-0.00
Management	0.09
Differentiate	0.43*
Implement	0.22

* p <.05

Table 6 Pearson Correlations of Legitimacy and Extent of Program Continuation

	Legitimacy	N
Months	0.37*	28
Days/Week	0.06	27
Units	0.44**	27

* p <.05
** p <.01

Table 7 Regression Analysis of Program Legitimacy and Number of FO/D Units Completed, Controlling for Grade Level and Adequacy of Resources

Dep Var: Units N=23
Multiple R: .80 Squared Multiple R: .65
Adjusted Squared Multiple R: .59
Standard Error of Estimate: 0.54

Variable	Std Coef	Std Error	T	P (1 Tail)
Constant	0.00	0.43	2.49	0.01
Legitimacy	0.49	0.05	3.44	0.00
Grade	0.34	0.07	2.17	0.02
Resources	0.30	0.15	1.94	0.03

Analysis of Variance

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	9.98	3	3.33	11.49	0.00
Residual	5.50	19	0.29		